



## CASE REPORT

# Innervated island pedicled anterolateral thigh flap for neo-phallic reconstruction in female-to-male transsexuals

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### KEYWORDS

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**Summary** Many techniques have been described to create an aesthetic and functional neo-phallus after penile amputation or in female-to-male transsexuals. Microsurgical free-flap phalloplasty seems to be the preferred method of penile reconstruction. For many years the radial forearm free flap has been considered the best procedure, but other flaps have been attempted to minimize donor site morbidity and optimize outcome. Pedicled flaps are considered to be reliable and to decrease the risk of total failure. Recently, a one-stage non-microsurgical technique was described for phallic reconstruction in a young male patient. We report successful total phallic reconstruction in a female-to-male transsexual patient using an island pedicled anterolateral thigh (ALT) flap. Urethral reconstruction was left as a possible further procedure due to patient's preference. A malleable soft silicone penile prosthesis was inserted within the flap and the lateral cutaneous femoral nerve stump was sutured to the dorsal clitoris branch from the pudendal nerve for flap sensation. After 6 months, the patient demonstrated successful aesthetic and functional reconstruction referring to satisfactory sexual activity. To our knowledge, this is the first report of an innervated island pedicled ALT flap used for female-to-male penile reconstruction in a transsexual patient. The pedicled ALT flap may be a reliable option to avoid visible scarring at the donor site on exposed parts of the body, and reduce the risk of total flap failure from microsurgical procedures for reconstruction of a neo-phallus in this increasing population of patients.

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Since the first report of surgical phalloplasty in 1936,<sup>1</sup> many techniques have been described to create an aesthetic and functional neo-phallus after penile amputation or in female-to-male transsexuals.<sup>2</sup> Currently, microsurgical free-flap phalloplasty seems to be the preferred method to fulfill the goals of penile reconstruction.<sup>3–13</sup> For many years the radial forearm free flap has been considered the best procedure but, because of the donor site stigmata, other flaps have been attempted to minimize donor site morbidity and optimize aesthetic and functional results.<sup>2,3,14</sup> The recent development of perforator flap surgery led to introduction of the free anterolateral thigh (ALT) flap phalloplasty as a new technique for penile reconstruction.<sup>15</sup> However, there are instances where microsurgical phalloplasty is not suitable and there are many centres worldwide where microsurgical resources are not available. Pedicled flaps are always considered for their reliability or the decreased risk of total failure.<sup>16,17</sup> In 2000, Santanelli and Scuderi<sup>2</sup> introduced the use of the island tensor fascia lata flap and Mutaf<sup>18</sup> described his Istanbul flap. More recently, Mutaf et al.<sup>19</sup> described a one-stage non-microsurgical technique for phallic reconstruction in a young male patient using a pedicled ALT flap. To our knowledge, this is the first description of an island pedicled re-innervated ALT flap

for total phallic reconstruction in a female-to-male transsexual patient.

## Case report

In November 2006, a 31-year-old female patient, non-smoker, in a relationship with a female partner and affected by a diagnosed gender identity dysphoria, after 2 years of psychological survey by a specialist panel of psychiatrists and 2 years of hormonal treatment according to *The Harry Benjamin International Gender Dysphoria Association's Standards of Care Gender Identity Disorders, sixth version*,<sup>20</sup> was considered a suitable candidate to undergo surgical protocol for sex re-assignment. Bilateral mastectomy, bilateral oophorectomy and hysterectomy were performed 6 months before the patient presented for phalloplasty. The patient was not keen to have a preoperative expansion period in view of use of the island tensor fascia lata flap already performed at our institution; hence, penile reconstruction with an innervated island pedicled ALT flap from the left thigh was planned with patient agreement. The patient when informed about complications of phalloplasty and urethroplasty refused immediate urethral

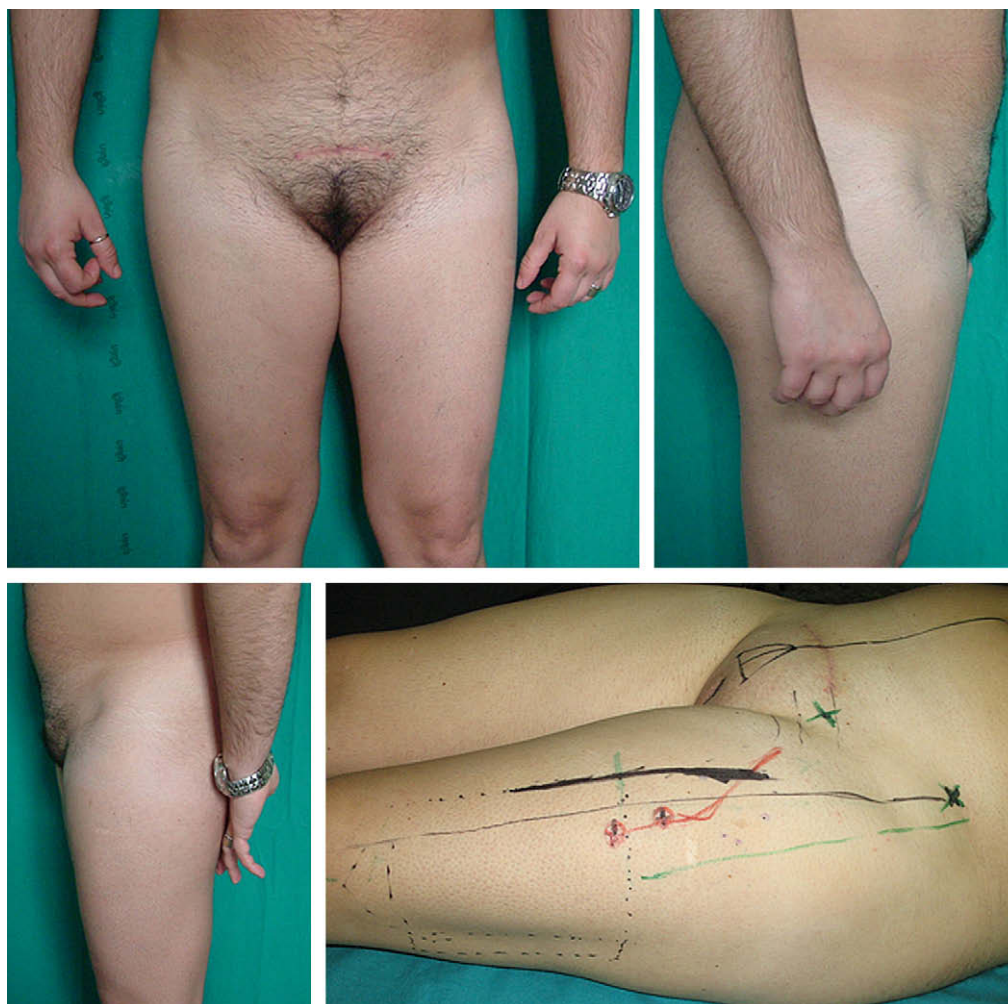
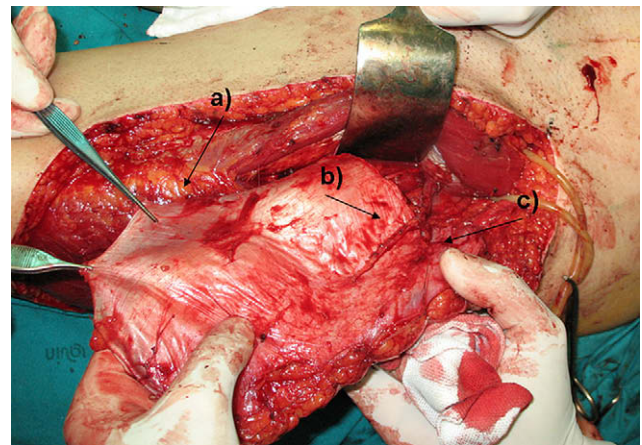


Figure 1 Preoperative views of patient.

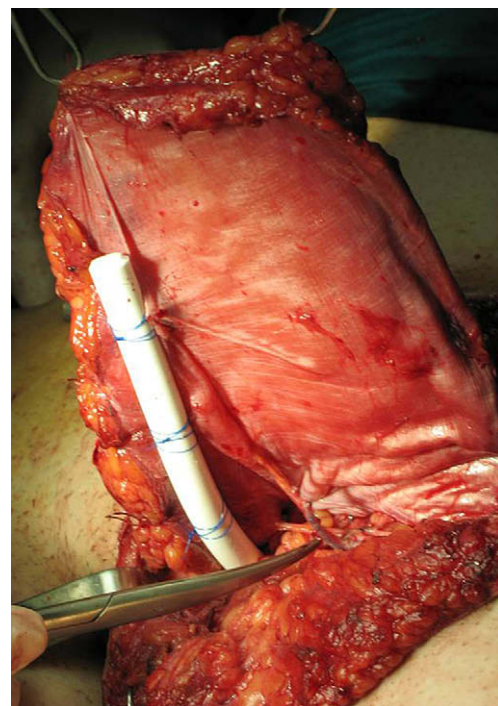
reconstruction because of the significant incidence of urethral fistulae and strictures.<sup>21</sup> Urethral reconstruction was left as a possible further procedure.

Preoperative planning was started by marking a line from the anterior superior iliac spine to the lateral border of the patella. Then, perforating vessels from the descending branch of the lateral femoral artery were located using a hand-held Doppler probe. These vessels are usually located just lateral to the marked line. Only those located distal to the mid-point of the reference line can be used for pedicled ALT, in order to warrant increased pedicle length. The outline of the flap was then marked on the skin. Two perforating vessels were identified, and the one distal to the mid-point was included in the flap design (Figure 1). A 16 × 12-cm rectangular skin island on the distal two thirds of the anterolateral thigh was marked, with the medial border on the reference line and proximal border approximately at the mid-level of the reference line. A strip of 3 cm of the fascia lata was marked as a lateral extension of the flap to obtain an adequate lining for a penile prosthesis (Figure 1). The dissection started, identifying the descending branch of the lateral circumflex femoral artery to its origin, and then the lateral cutaneous nerve of the left thigh was identified at the proximal border of the flap and dissected 5 cm in length. During the dissection, two perforators within the flap were identified, the most distal of which was not located by the Doppler preoperative assessment. After clamping the proximal perforator, the blood supply from a single perforator was not considered totally safe, and both of the perforators were maintained within the flap. The flap, with the 3-cm-wide strip of fascia lata, was harvested as an island flap based on both perforating vessels and the pedicle was dissected up to its origin (Figure 2). A V-shaped incision was made in the pubic skin and the ALT flap was transferred to the pubic region underneath the proximal insertion of the rectus femoris muscle through an incision in the left groin region. Subcutaneous tunnelling of the flap was initially planned but, in this case, was considered unsafe, due to the traction and tension over the flap pedicle. A malleable soft silicone penile prosthesis (Virilis II, Giant Medical, Cremona, Italy), fixed and covered by the fascia lata, was inserted and the flap was wrapped around the prosthesis (Figure 3). The dorsal nerves of the clitoris, terminal branches of the pudendal nerves, were dissected deeply on the sides of the corpora cavernosa of the clitoris. The lateral cutaneous femoral nerve stump was coapted, end to side, to the right dorsal nerve of the clitoris. Prosthesis and flap were then sutured to the periosteum of the pubic region. Flap donor site closure was performed with meshed 1:1.5 split-skin grafts taken from the contralateral thigh. Prophylactic low-molecular-weight heparin (enoxaparin 4000 I.U., 40 mg, s.c.) was started the day before surgery and continued for 13 days. Antibiotic therapy was administered using gentamycin (80 g, every 8 h for 6 days, i.v.) and amoxicillin/clavulanic acid (1.2 g, every 8 h for 6 days, i.v.). A urethral catheter was maintained for 12 days and the flap was supported at a 90° angle using two lateral slings of adhesive tape from the shaft of the neo-phallus to the hips. The patient was kept in bed for 10 days and then allowed to walk under medical supervision. No complications arose in the postoperative period and the patient was discharged after 20 days of



**Figure 2** Flap harvesting. a) The two forceps show the strip of fascia lata included within the flap. b) Distal perforator. c) Proximal perforator.

hospitalization. After 6 months, the patient had achieved a satisfactory aesthetic and functional reconstruction (Figure 4). Cutaneous sensitivity had improved since the first week following reconstruction and tactile sensation on the entire neo-phallic shaft was re-established. Tactile sensation of the clitoris was maintained. The patient underwent sensory threshold measurement for warm, cold and vibratory sensitivity and the Buckling test for neo-phallus rigidity. Quantitative sensory tests were performed with a thermal and vibration Genito Sensory Analyzer (Medoc



**Figure 3** The soft malleable silicone prosthesis is fixed to the flap before being wrapped around by the fascia and flap tissues. The instrument shows the vascular pedicle.





**Figure 4** Postoperative views of patient, after 6 months.

Ltd, Israel), with vibration frequency range between 0 and 100 Hz and thermal range between 32 °C and 50 °C for warm sensation and 10 °C and 32 °C for cold sensation. Dorsal, ventral and lateral aspects of the neo-phallus were assessed and compared to the patient's left thenar prominence (0.6 Hz, 28.8–34.4 °C). Results were all within the normal ranges of vibration and thermal sensation (1.7–2.2 Hz and 27.7–37.8 °C). The rigid test was positive for 750 g axial pressure. The patient reported satisfactory sexual activity and for this reason refused a more rigid prosthesis; moreover, he reported to feel subjective erogenous stimuli during intercourse.

At the time of this report the patient was still not interested in urethral reconstruction. During the follow-up period, no major or other complications arose.

## Discussion

The number of requests for penile reconstruction in female-to-male transsexuals is increasing worldwide.<sup>14</sup> Good aesthetic outcome, tactile and erogenous sensation, ability to penetrate and minimal donor site morbidity are the goals of this surgical procedure.<sup>2,3,14</sup> All these targets can be achieved using a pedicled island flap without the need for microsurgery.<sup>19</sup> In the present case, we used an innervated pedicled island ALT flap obtaining an aesthetically satisfactory neo-phallus with natural look and dimensions. We did not reconstruct a neo-urethra during the first stage of the procedure due to patient preference. Reconstruction of the scrotal bursa and the eventual neo-urethra was left for a later stage. After 6 months, cutaneous sensation

was almost totally restored and the patient referred to satisfactory sexual activity.

Use of the island pedicled innervated ALT flap for total neo-phallic reconstruction is a new technique to avoid visible donor site morbidity, as occurs with the radial forearm flap, and to reduce the risk of total flap failure and avoid the prolonged operative time of microsurgical techniques.<sup>19</sup> The donor site cannot be closed directly because of the need for 10–12 cm width to let the flap be rolled around the prosthesis. Even if the donor site needs skin grafting, it is located in a non-exposed part of the body and eventually can be hidden with boxer-type underwear.

As suggested by Mutaf et al.,<sup>19</sup> we added a 3-cm-wide strip of vascularized fascia lata along the entire length of the flap. This was very easy to harvest as part of the flap and, creating a neo-tunica around the penile prosthesis, permitted adequate implant covering, decreasing the possibility of extrusion or, as a mechanical and biological barrier, implant infection. This neo-tunica may help in protecting the penile prosthesis against trauma during sexual activity and the overlying flap skin from pressure sores in the long term. The thickness of the flap may help during sexual intercourse, giving adequate penile stiffness and consistency around the implant, and providing resistance against the longitudinal and transversal distortion which can occur during sexual penetration.

Testing confirmed good rigidity of the neo-phallus, demonstrating an axial loading force of 750 g without bending of the penile shaft. We used a soft malleable silicone implant for creation of a comfortable fibrous row for an eventual semi-rigid implant in order to increase the coitus ability of the neo-phallus. However, after 6 months, the patient was satisfied with his sexual activity and did not ask for a more rigid prosthesis.

Tunnelling of the flap is suggested to minimize scarring for a better aesthetic outcome.<sup>19</sup> In this case, although we obtained an adequate pedicle length maintaining attachment to the proximal perforator, we felt it unsafe not to visualize the pedicle during flap transfer in its rotation and rolling, in order to check the tension of the entire pedicle. As shown in Figure 4, groin scarring did not affect exposed parts of the body. Using only the most distal perforator may allow safe tunnelling of the flap, but in the present patient, after clamping of the proximal perforator, flap perfusion was thought to be less reliable and hence skin incision was performed.

Genito Sensory Analyzer measurement and patient satisfaction with sexual activity confirmed re-innervation of the neo-phallus. Use of the island pedicled ALT flap seems to be reliable and safe because the length of the pedicle is adequate for comfortably transferring the flap into the pubic region. The use of distal perforators is suggested for a safer transfer but, in this patient, keeping the proximal perforator for safer flap perfusion did not affect the outcome of the procedure.

To our knowledge, this is the first report of an innervated island pedicled ALT flap being used for penile reconstruction in a female-to-male transsexual patient. This flap appears to be a reliable option to fulfill the aim to avoid visible scarring at the donor site on exposed parts of the

body and to reduce the risk of total flap failure from microsurgical procedures in the reconstruction of a neo-phallus in this increasing population of patients.

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